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# LSP ADVISORY SERVICES OVERVIEW





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# LSP SMART = Supplemental Advisory and Risk Team



- While LSP believes the full LSP launch service provides the best value and highest probability of launch success, we recognize that some customers cannot or choose not to use our full service
  - LSP's job is to enable NASA missions to get to orbit
  - LSP expertise can be used throughout the industry
- Advisory Services are a SMART part of LSP providing mission excellence for all NASA missions
  - Typical customers would be SMD Mission Projects launching on FAA licensed commercial, DoD provided, or Foreign Cooperative vehicles
  - Each type of launch has its own unique considerations for LSP Advisory Services
- Advisory Services do not include the full service budget items normally accounted for in LSP budgets (e.g. payload processing, mission unique items, telemetry)
  - \$2M ROM was developed in ~2009 for a specific USAF mission with significant LV development and a large number of contract meetings and CDRLs to be reviewed
  - LSP does not get \$2M directly from SMD for 2016 Heliophysics Explorer advisory services



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# Supplemental Advisory and Risk Team Tenets



- SMART services integrate LSP Program, Engineering, and SMA positions as advice to our customer/partner
  - Offering advisory services, but not inserting ourselves without customer request
  - Overall Advisory Plan Exists, but LSP will document each advisory service separately to define what LSP will do, responsibilities, and resources required
- LSP utilizes existing insight and risk management processes to provide evaluations of mutually agreeable items
  - Subject to constraints and data provided by the partner/customer
  - Reporting of risks by LSP shall be coordinated with the customer project and will include a range of mitigation options and offer a coherent go-forward plan
- LSP won't take overall mission assurance responsibility when in an advisory role because mission assurance is a complex combination of the full complement of LSP services
  - The responsibility for overall mission success of the Mission rests with the Spacecraft Project and SMD
  - LSP does not lead the negotiations or manage contracts as an Advisory Service
  - Create Memorandum of Understanding (MOU) between LSP and the Project defining the roles and responsibilities associated with a SMART with SMD agreement and Agency Stakeholder knowledge



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# Agency Policy is Flexible



## NPD 8610.7 RISK CATEGORIES FOR LAUNCH

1. No Flight History
2. At least 1 successful flight
3. String of successful flights

LSP non-recurring technical  
evaluation consistent with  
risk posture and flights

## NPD 8610.23 TECHNICAL OVERSIGHT

- Intend to achieve highest practicable probability of mission success
- Approval mission unique items
- Insight into everything
- LSP Engineering Review Board
- NASA "Changes" Clause

## NPD 8610.24 LAUNCH REVIEW PROCESS

Program Manager LVRR  
SMSR  
FRR  
LRR  
Certificate of Flight Readiness  
Final Poll For Launch

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- Launches purchased under spacecraft contracts for on-orbit services, DoD provided services, or other innovative contractual arrangements are addressed as follows:
    - Certification and LSP non recurring technical assessment is not required but NASA shall pursue a similar risk assessment strategy whereby the vehicle's demonstrated flight history will be consistent with the overall mission risk
    - Application of NPD 8610.23 will be reviewed and approved through the Flight Planning Board
      - » Not credible for NASA to perform technical oversight of DoD or Foreign Co operative services
    - Launch Readiness Reviews as specified in NPD 8610.24 are not required, but an appropriate mission readiness decision process is required



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# Examples of LSP-Provided Advisory Services



- NASA delivery on orbit missions
  - CRS: Falcon 9 initiated mid 2009, Taurus 2 initiated mid 2010
  - GOES-O/P on Delta IV completed
- Foreign cooperative missions
  - James Webb Space Telescope (JWST): Ariane V
  - Global Precipitation Measurement (GPM): Japanese H-IIA
  - GRACE Follow On
  - NISAR
- DoD provided launch services
  - NASA LADEE mission: Minotaur V
  - DoD Operationally Responsive Space (ORS) mission approved but not executed due to LV availability
- Launch vehicle centric services
  - Falcon 1 initial DARPA missions completed
  - Taurus 2 ALP and Space Act Agreement initiated early 2008 completed
  - SLV-A/B ALP and Space Act Agreement completed
  - Minotaur IV+ IPT initiated in 2007 completed



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# Spacecraft Project Responsibilities



- Provided with commercial level of insight into the flight worthiness of the launch vehicle, by the launch provider who has the responsibility to make that determination
- Provide all contractual direction to their contractors
- Determine the adequacy and approval/concurrence for deliverables and reviews described in their launch arrangement
- Identify specific items of concern and contact LSP to determine mutually agreeable tasks and reviews that require LSP support
- Provide the required data or access necessary for technical evaluation(s) requested of LSP
- Resolution of technical differences between LSP, the spacecraft contractor, and/or the launch provider
- Project Manager has the responsibility for giving the NASA spacecraft "Go for launch"



# SMART Team Baseline Tasks



- The Launch Services Program will participate in the typical reviews with a Mission Manager or Vehicle Systems Engineer at a minimum.
  - Subsystem Engineers and analysts may attend based on the issues identified by the Project
  - LSP reserves the right to have Program or Engineering Management participation at their discretion.
- The Launch Service Program will evaluate the risks and issues identified by the launch provider and provided to the spacecraft customer
  - Depth of LSP evaluation will be mutually agreeable between the Project and the LSP based on the level of risk, or significance of the issue in question.
  - The evaluation will be subject to the data provided by the launch provider under the agreement to launch the mission
  - In addition mutually agreeable Launch Vehicle related tasks, may be requested of the LSP by the Project.
  - LSP will provide cost and schedule estimates for any assigned task beyond the scope of the risk/issue evaluation.



# SMART Options \*



- LSP can advise (.ie., review and comment) on mission management functions in the following areas (Project in coordination with SMD to select any/all/or none of the below)
  - Mission budget development
  - Mission Requirement Document development
  - ICD development
  - Mission Requirement Verification
  - Payload Safety documentation
  
- LSP can advise on launch campaign management and launch day operations in the following areas (Project in coordination with SMD to select any/all/or none of the below):
  - Readiness review process
  - Launch management structure
  - Launch day requirements definition & categorization
  - Status checks and Go/No-Go Calls
  - Communications protocol
  - Polling structure
  - Recycle requirements
  - Mission Dress Rehearsal process
  - Payload Processing requirements development and/or implementation





# SMART Options \*



- LSP can advise on Safety and Mission Assurance items in the following areas
  - Mission Assurance “risk assessment”
  - Payload ground safety (would not envision this for WFF launch)
  - Range Safety Compliance (would not envision this for WFF launch)
- On launch day the LSP can (Project to select any/all/or none of the below):
  - Provide a Senior Systems Engineer to advise the Project manager.
  - Provide Systems Engineer(s) to interface with the launch team as requested by the Project Launch Vehicle Liaison.
    - » The launch team will be technical and will not contain any launch management functions or a classical “NASA Advisory Team”.
  - Provide observations on launch vehicle telemetry, if made available by the Project, to the designated counterpart. Recommendations will be provided as requested by the Project (NOTE: NOT LIKELY BASED ON WHAT COMMERCIAL PROVIDERS MAKE AVAILABLE ON LAUNCH DAY)